## Professor David StJohn, University of Queensland, Australia

Professor StJohn's research interests are the solidification of Al, Mg and Ti alloys and topics ranging from wear and corrosion, reduction of iron oxides and microstructure-property relationships and has published 350 papers in journals and conference proceedings. Prof StJohn was awarded the John Campbell Medal in 2014, the Materials Australia Silver Medal in 2011, the American Society of Metals Henry Marion Howe Medal in 2006 and the Magnesium Technology Award by TMS in 2003.

Professor StJohn has held appointments in Canada, RMIT University and CRA-Advanced Technical Development in Perth as well as a long association with UQ.

Prof StJohn has made a significant contribution to developing research – industry partnerships. He was with the CAST Cooperative Research Centre becoming CEO from August 2002 until 2008. He led the successful bid for the Defence Materials Technology Centre (DMTC) in 2008 and initiated the Centre for Advanced Materials Processing and Manufacturing (AMPAM) at UQ in 2009. Current industry partners include Magontec, Cook Medical, Bluescope Steel, Nihon Superior and Baosteel.

Professor StJohn has also received funding from the Queensland State Government and the Australian Federal Government for the Advanced Engineering Building (AEB) and was Chair of the Project Control Group for the construction of the AEB, completed in 2013. Prof StJohn is currently Emeritus Professor at UQ.

**ABSTRACT**

**A personal perspective on the intersection between materials science and the research priorities of manufacturing and government**

A scientific journey of over forty years supported and inspired by creative interactions with the manufacturing industry and government priorities is explored. This exploration focuses on examples of the presenter's research from peritectic solidification to extractive metallurgy, tough ceramics, light metal alloy design, corrosion, casting and back to the study of solidification characteristics such as hot tearing and grain refinement. The varied pathways of this research were built on a foundation of a strong desire to carry out fundamental research that was influenced by industry and government research priorities. Another important factor that facilitated applied and scientific discovery is the joy of collaboration. In parallel to details of the science, the talk will reflect on these considerations in terms of what research was selected, how it was undertaken and the impact the outcomes had on manufacturing and the field of materials science.

## Professor K.A. Khor, Nanyang Technological University (NTU), Singapore

K. A. Khor is a professor at School of Mechanical & Aerospace Engineering in Nanyang Technological University (NTU), Singapore, and currently served as the Director of Research Support Office & Bibliometrics Analysis in NTU. He received his PhD degree from Monash University, Australia. He worked as an Experimental Scientist at the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Melbourne before joining NTU in 1989. He has held a number of academic, research and administrative appointments, such as Deputy Director, Singapore-MIT Alliance (SMA), Singapore Office; Director (Projects) at the National Research Foundation (NRF) of Singapore; Associate Provost (Research), President's Office, NTU. He is also the President, Institute of Materials, East Asia (IoMEA) from 1996.

Professor Khor's research focus is on nano-bioceramics and nano-composites for artificial cornea implants, orthopaedic and dental implants, spark plasma sintering (SPS) of nano-materials and nano-powders (metals and ceramics), thin films, thermal sprayed coatings, thermal barrier coatings (TBC) for aerospace applications and solid oxide fuel cells. He has published over 265 peer reviewed journal articles on the above research topics. These papers have ~9200 citations (h-index = 51). In his current role as Director, Bibliometrics Analysis in NTU, he conducts various studies on research trends of technological fields. He is also the Principle Investigator of a project funded by the Singapore National Research Foundation on "Assessing

Singapore's Research Funding Programs For Young Global Talents: Collaboration Networks, Spillovers And Identifying Predictors Of Success.

**ABSTRACT**

**Advanced materials processing trends: towards a more integrated and data-intensive approach for sustainable manufacturing**

In the past 30 years, advanced materials processing has seen unprecedented progress into new frontiers resulting in increased changes to the manufacturing sector. Traditional manufacturing as we know it has been gradually replaced by irrefutable developments such as an ever increasing reliance on modeling and simulation; materials innovation; information technology and orientation towards sustainable manufacturing. This talk will focus on the development on advanced materials using various analytical tools to better elucidate the forces that provided the drive to the demand as well as the competition among materials which determine the future directions of advanced materials research. Examples can be seen in various aspects of advanced materials including aerospace; biomaterials and automobile industries. An example is the large investments in graphene and carbon nanotubes for nanoscale applications which have the potential to fundamentally change electronics and renewable-energy applications.

Past trends will be presented so that its development can be better understood from the present-day perspectives; these examples include metal matrix composites and other “hot” topics such as biomaterials; additive manufacturing and advanced surface engineering.

## Professor B.S. Murty, Indian Institute of Technology – Madras, India

Dr. B.S. Murty is Girija & R. Muralidharan Institute Chair Professor at the Department of Metallurgical and Materials Engineering, IIT Madras since 2004 and is currently the Head of the Department. He has obtained his PhD (1992) from IISc, Bangalore and started his professional career as a faculty member at IIT Kharagpur and served there during 1992-2004. He is also an Adjunct Professor at Ryerson University, Canada and an Associate Faculty member of School of Engineering, University of British Columbia, Canada.

His fields of interest are microstructure-property correlations in nano materials and other advanced materials such as bulk metallic glasses, high entropy alloys and in-situ composites. He has authored about 350 journal publications. He has recently published two books, namely, “Text Book on Nanoscience and nanotechnology” and “High Entropy Alloys”. He has supervised 31 PhDs and 14 PhDs are ongoing. He has handled over 50 sponsored research projects and filed 15 patents. He is a recipient of Shanti Swarup Bhatnagar Award, the highest honour for a scientist in India, a Fellow of all Science Academies and the Engineering Academy of India, Asia Pacific Academy of Materials and ASM International. He is also the recipient of Life Time Achievement Award by IIT Madras, Metallurgist of the Year Award and Young Metallurgist Award of Ministry of Steel and Mines, GD Birla Gold Medal, MRSI Medal, INAE Young Engineer Award, INSA Young Scientist Award and ISCA Young Scientist Award.

**ABSTRACT**

**Challenges in high entropy alloy research**

HEAs are a new class of multi-component equiatomic (or near equiatomic) alloys, which form simple solid solutions due to their high configurational entropy. The formation of nanocrystalline HEAs has made them more interesting due to their fundamental and technological importance. It is important to note that all multi-component equiatomic alloys do not lead to the formation of single phase solid solution or for that matter mixture of solid solutions. In a number of cases, these so called HEAs, have shown the formation of intermetallic phases and in some cases phase separation of certain elements with high positive enthalpy of mixing with other elements.

Prediction of the phase formation in high entropy alloys is a major challenge in this field. Understanding the stability the phases is also a major challenge due to the sluggish diffusivity in these alloys. Processing of the alloys for useful applications is also an important area that is attracting the attention of researchers in this field. The present paper addresses a number of these issues based on the ongoing work in the research group of the speaker.